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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,131	03/31/2004	Xiuzhang James Zhang	839-1546	3717

30024 7590 11/09/2005

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EXAMINER

VERDIER, CHRISTOPHER M

ART UNIT	PAPER NUMBER
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3745

DATE MAILED: 11/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/813,131	ZHANG ET AL.	
	Examiner	Art Unit	
	Christopher Verdier	3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3-31-04, 5-18-04 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6-24-04</u> . | 6) <input type="checkbox"/> Other: _____ |

Receipt and entry of Applicants' Preliminary Amendment dated May 18, 2004 is acknowledged.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the coating (claims 1, 10, and 13), the first bondcoat layer and the second bondcoat layer (claims 4-6, 9, and 10-12) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Figure 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: Appropriate correction is required.

In paragraph 6, line 4, "having" should be changed to -- each having a --.

In paragraph 8, line 5, "therein" should be changed to -- thereon --.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 2, which recites the specified diameter is about 0.033 inch, and the counter-bore diameter is about 0.053 inch, has no antecedent basis for the underlined terms.

Claim 3, which recites that the counter-bore depth is about 0.030 inch, has no antecedent basis for the underlined term.

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Claim 8, which recites the specified diameter is about 0.033 inch, the counter-bore diameter is about 0.053 inch, and the counter-bore depth is about 0.030 inch, has no antecedent basis for the underlined terms.

Examiner's Suggestions to Claim Language

The following are suggestions to improve the clarity and precision of the claims:

In claim 1, line 5, -- a -- may be inserted after "of".

Claim Objections

Claims 1-9 and 13 are objected to because of the following informalities: Appropriate correction is required.

In claim 1, line 3, "having" should be changed to -- each having a --.

In claim 13, second to last line, "diameter" should be changed to -- diameters --.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 10, line 6, "said region" is unclear as to what region of the blade this refers to. In claim 10, line 8, "the specified diameter" is unclear as to which element this refers to. In claim 13, lines 3-4, the recitation of the turbine component having a protective coating

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therein is inaccurate; the protective coating is located on the turbine component and not in the turbine component. In claim 13, line 6, "with a counter-bore and an exit end" is incomplete and unclear. Perhaps applicant intends this phrase to be -- a counter-bore at an exit end --.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4-6, and 13 (as far as claim 13 is definite and understood) are rejected under 35 U.S.C. 102(b) as being anticipated by Gupta 5,771,577 (figures 3A-3D). Note the turbine component 10 having a plurality of film-cooling holes 12 formed in a region of the component to be cooled, the cooling holes having a specified diameter 14, each hole at an exit thereof formed with a counter-bore 18 of predetermined depth, the component having a coating 22 applied thereto at least in the region, wherein the counter-bore provides an area for excess coating material to accumulate without reducing the specified diameter. The specified diameter is in the range of about 0.01 to 0.04 inch, and the counter-bore diameter is about 0.02 to 0.10 inch. The coating comprises a first bondcoat layer and a second thermal barrier coating layer, with the bondcoat layer being Ni-Al based material and the thermal barrier coating being yttria stabilized zirconium material. Also disclosed is a method of maintaining cooling efficiency of the film-cooling holes in the turbine component, where the film-cooling holes have specified diameters

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14 and the turbine component has the protective coating thereon, comprising a) before coating, forming each film-cooling hole with the counter-bore at an exit end of the film-cooling hole; and b) spraying the coating onto the turbine component at least in areas surrounding the film-cooling holes such that excess coating material accumulates in the counter-bore without reducing the specified diameters of the cooling holes. See column 2, lines 11-25, column 4, lines 60-67, column 5, lines 1-7, column 5, lines 18-39, and column 6, lines 1-7.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 1-2, 4-7, and 9-12 (as far as claims 10-12 and definite and understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent 60-32,903) in view of Gupta 5,771,577. The Japanese patent (figures 1-4 and 5b) discloses a turbine component 1 substantially as claimed, including plural film-cooling holes 15 formed in a region of the component to be cooled, the cooling holes having a specified diameter 16, each hole at an exit thereof formed with a counter-bore 17 of predetermined depth, the turbine component being a gas turbine bucket having an airfoil portion at 1 and a shank portion 2, the region comprising the airfoil portion.

However, the Japanese Patent does not disclose that the component has a coating applied thereto in the region (claim 1), with the specified diameter being about 0.033 inch (claim 2), the counter-bore diameter being about 0.053 inch (claim 2), the coating comprising a first bondcoat layer and a second thermal barrier coating layer (claim 4), with the bondcoat layer being Ni-Al based material (claim 5) and the thermal barrier coating being yttria stabilized zirconium material (claim 6), the coating comprising a first bondcoat layer and a second thermal barrier coating layer, with the bondcoat layer being Ni-Al based material (claim 9), and does not disclose that the component has a coating applied thereto in the region, with the coating comprising a first bondcoat layer and a second thermal barrier coating layer (claim 10), with the bondcoat layer being Ni-Al based material (claim 11) and the thermal barrier coating being yttria stabilized zirconium material (claim 12).

Gupta (figures 3A-3D) teaches that turbine components including turbine blades may have plurality of film-cooling holes 12 formed in a region of the component to be cooled, the cooling holes having a specified diameter 14, each hole at an exit thereof formed with a counter-bore 18 of predetermined depth, the component having a coating 22 applied thereto at least in the region, wherein the counter-bore provides an area for excess coating material to accumulate without reducing the specified diameter, with the specified diameter being in the range of about 0.01 to 0.04 inch, and the counter-bore diameter being about 0.02 to 0.10 inch, for the purpose of preventing flow restriction through the holes below the amount established by the specified diameter. The coating comprises a first bondcoat layer and a second thermal barrier coating layer, with the bondcoat layer being Ni-Al based material and the thermal barrier coating being yttria stabilized zirconium material, for the purpose of protecting the turbine component from hot gases.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the turbine blade of Japanese Patent 60-32,903 with a coating applied thereto in the region, and to form the specified diameter to be about 0.033 inch, to form the counter-bore diameter to be about 0.053 inch, with the coating comprising a first bondcoat layer and a second thermal barrier coating layer, with the bondcoat layer being Ni-Al based material and the thermal barrier coating being yttria stabilized zirconium material, as taught by Gupta.

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Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta 5,771,577 in view of Fric 6,383,602. Gupta discloses a turbine component substantially as claimed as set forth above, but does not disclose that the counter-bore depth is about 0.030 inch.

Fric (figures 5-8 and column 5, lines 35-48) teaches that film-cooled turbine components 40 may have cooling passages 46 with a counterbore 51, 56 at the exit of the passages having a depth of about 0.030 inch, for the purpose of providing increased cooling effectiveness.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the depth of the counter-bore in the turbine component of Gupta such that it is about 0.030 inches, as taught by Fric, for the purpose of providing increased cooling effectiveness.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent 60-32,903 and Gupta 5,771,577 as applied to claim 7 above, and further in view of Fric 6,383,602. The modified turbine component/gas turbine bucket of Japanese Patent 60-32,903 shows all of the claimed subject matter, except for the counter-bore depth being about 0.030 inch.

Fric (figures 5-8 and column 5, lines 35-48) teaches that film-cooled turbine components 40 may have cooling passages 46 with a counterbore 51, 56 at the exit of the passages having a depth of about 0.030 inch, for the purpose of providing increased cooling effectiveness.

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It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the depth of the counter-bore in the modified turbine component/gas turbine bucket of Japanese Patent 60-32,903 such that it is about 0.030 inches, as taught by Fric, for the purpose of providing increased cooling effectiveness.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lee '523, '778, '328, Soechting 2004/0096328, Kercher, and European Patent 207,799 are cited to show turbine components with counterbored cooling passages.

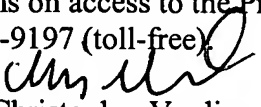
Lee '135 is cited to show a turbine bucket with a shank.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
November 4, 2005


Christopher Verdier
Primary Examiner
Art Unit 3745